

ABSTRACT

During etching of a contact hole, not only the energy of ion irradiation but also the gas composition are altered to change the etching from a high-rate etching to a low-rate etching, thereby reducing the damage. In the low-rate etching where the gas composition is also altered, a firm fluorocarbon film is formed on the bottom of the contact hole, and the etching can be carried out while protecting the silicon surface. Consequently, inactivation of the impurities doped in the silicon surface can be prevented.